CLAIMS

1. A method for prepurifying air by adsorption using two adsorption receptacles operating in parallel, alternately and in a TSA cycle, each receptacle containing at least one adsorbent arranged in at least one adsorption bed, each adsorption cycle comprising at least:

a) an adsorption step during which at least part of the impurities present in the air is removed by adsorption on said adsorbent, at an adsorption temperature (T_{ads}), the air crossing the adsorption bed centripetally,

b) a regeneration step during which the adsorbent used in step a) is regenerated by flushing with a regeneration gas at a regeneration temperature (T_{reg}), such that $T_{reg} > T_{ads}$, the regeneration gas crossing the adsorption bed centrifugally, in order to desorb the impurities adsorbed in step a),

c) an adsorbent cooling step during which the temperature of the adsorbent regenerated in step b) is reduced,

characterized in that:

- in step a), the adsorption time (T_{ads}) is between 60 and 120 minutes,

- in step b), and optionally in step c), the regeneration gas is introduced into one or the other of the adsorption receptacles in order to flush centrifugally the bed containing the adsorbent used in step a), the regeneration flow rate during these steps being lower than or equal to 35% of the adsorption flow rate, and

- in step b), the regeneration temperature is reached using a heat exchanger arranged outside the adsorbers.

2. The method as claimed in claim 1, characterized in that, before the regeneration gas is sent to an adsorber to be regenerated in a step b), the regeneration heater used to heat the regeneration gas and all or part of the heating circuit, located between said heater and the adsorber to be regenerated, are brought to the regeneration temperature.

3. The method as claimed in either of claims 1 and 2, characterized in that in step b), at least one heating parameter is controlled, selected from the group formed by the heating time, the temperature and the flow rate of the regeneration gas, so that the maximum temperature at the outlet of each adsorber is at least 30% lower than the temperature at the inlet of the adsorber concerned, preferably at least 60°C lower.

4. The method as claimed in one of claims 1 to 3, characterized in that in step a), the adsorbent used is at least one zeolite and, preferably, at least one alumina.

5. The method as claimed in one of claims 1 to 4, characterized in that in step b), the regeneration gas is nitrogen or a nitrogen-rich gas.

6. The method as claimed in one of claims 1 to 5, characterized in that it comprises a step of filtration of the gas produced using a filtration means located downstream of the adsorbers.

7. The method as claimed in one of claims 1 to 6, characterized in that in step b), at least one heat exchanger is used to heat the regeneration gas and at least one bypass circuit is used, arranged for bypassing the heat exchanger.

8. The method as claimed in one of claims 1 to 7, characterized in that the adsorbent used is a binderless LSX type faujasite zeolite.

9. The method as claimed in one of claims 1 to 8, characterized in that the regeneration flow rate is between 20 and 30% of the adsorption flow rate and/or in step a) the adsorption time (T_{ads}) is between 90 and 120 minutes.

10. The method as claimed in one of claims 1 to 9, characterized in that it further comprises a step of cryogenic distillation or fractionation of the purified air, to produce nitrogen, oxygen and/or argon.